The fireboats used by the Marine Division of the New York City Fire Department (FDNY) use Rotork's IQ range of part-turn intelligent electric actuators to keep the city safe. The IQ part-turn actuators provided are used on two fireboats, "Firefighter 2" and "Firefighter 342". The actuators have the important duty of controlling the flow of water to the fire nozzles on deck, meaning that they are vital in the event of an emergency.

New York City is one of the busiest ports in the world and has 560 miles of waterfront. The FDNY has long employed these two ships are the largest in their fleet. These two ships are the largest in their fleet. The fireboats used by the Marine Division of the New York City Fire Department (FDNY) use Rotork's IQ range of part-turn intelligent electric actuators to keep the city safe. The IQ part-turn actuators provided are used on two fireboats, "Firefighter 2" and "Firefighter 342". The actuators have the important duty of controlling the flow of water to the fire nozzles on deck, meaning that they are vital in the event of an emergency.

The fireboats are equipped with high-pressure pumps that are capable of delivering 500,000 pounds per square inch of water. The actuators are used to control the flow of water to the fire nozzles on the decks of the fireboats. These nozzles are designed to be powerful enough to put out fires quickly and efficiently.

The IQ actuators are connected to the nozzles by pipes, which are laid out in a manner that allows for maximum coverage of the area. Emergency departments such as the FDNY rely on these intelligent actuators to ensure that they have the most effective tools for fighting fires. The fireboats are equipped with high-pressure pumps that are capable of delivering 500,000 pounds per square inch of water. The actuators are used to control the flow of water to the fire nozzles on the decks of the fireboats. These nozzles are designed to be powerful enough to put out fires quickly and efficiently.

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In some of the most critical industries in the nation, an essential piece of valve automation has long been an afterthought. VanAire is working hard to change that.

By engineering and manufacturing mounting kit components – the brackets, couplings, and hardware that connect valves and actuators – to exacting standards, VanAire has extended the quality, safety, and longevity of their clients’ equipment.

“Over the past 25 years, our clients have come to understand that having engineered mounting kits is essential for their reputation,” notes Steve Soderman, CEO of VanAire. “Even if they’re using a great valve and actuator, if they don’t give the mounting kit the same attention, their equipment may fail prematurely.”

VanAire partners with leading valve and actuator manufacturers and their distributors across North America and beyond. Producing kits that weigh from about a pound to over a ton, these components – which API and ISO classify as torque transmitting devices – are used in the oil and gas, power, mining, waste and wastewater, chemical, pulp/paper, and food production industries, to name a few.

“In some cases, convincing manufacturers and their distributors to put the same quality and safety lens on mounting kits as they do their valve or actuator requirements isn’t easy,” states Soderman.

“Changing a paradigm takes time, patience, and facts; in some cases, it took equipment failure, or worse, for them to consider that an inadequately designed mounting kit may be the root cause of the assembly not functioning as expected,” says Tony Lambert, VP of Valve Automation Hardware. “VanAire is proud to be recognized as a global leader in valve automation hardware and a go-to source of mounting kit solutions because we adhere to application requirements along with industry and customer specifications.”

Because the mounting kit is truly an essential piece of the assembly, many of the questions asked when specifying a valve or actuator need to be addressed when designing a mounting kit. Process and ambient temperature, number of cycles, cycle speed, on/off or modulating use, and/or corrosion, to name a few, may all affect design and materials selection. For example, a mounting kit for an offshore drilling rig may require a different design than a kit operated at room temperature.

“Along with our experienced and ultra-efficient team, the design and manufacturing consistency resulting from our formal ISO 9001:2015 Quality Procedures and Work Instructions really set us apart,” adds Eric Miller, VP of Manufacturing. “These quality procedures have enabled us to increase our throughput, reduced our lead times and – at the same time – increased our on-time delivery to customers on a global scale.”

Within VanAire’s 45,000-square-foot facility in Gladstone, Michigan, visitors will find more than 75 skilled professionals including professional and mechanical engineers, certified solidworks professionals (CSWP), American Welding Society (AWS) certified welding inspectors and qualified welders, and American Society of Mechanical Engineers (ASME) section IX welders utilizing the following state-of-the-art resources: 15 3D CAD stations with FEA capabilities, more than 30 CNC machines including robotic welders, laser-cutting systems, machining centers, turning centers, press brakes, blind hole keyseaters, and robotic machine tenders.

“VanAire’s success is not a result of happenstance or luck,” notes Miller. “Our strategy from day one was to be known as the engineering leader in this industry that a mounting kit is indeed a critical part of the assembly.”

What’s next for VanAire? Lambert says being a leader in this industry is a humbling, honoring, yet challenging position to be in. He knows VanAire needs to be constantly looking forward to ensure that it continues to take what it has learned and apply that knowledge in a way the team, customers, and industry as a whole can benefit from.

“We feel that 2020 will be a milestone year for us,” says Lambert. “We are going through a process that not only refreshes our brand logo but also helps promote our mission and culture. One of the key parts to our continued success is to ensure that our team members know why VanAire does what we do and the way we do it. If your team doesn’t know the why, then it’s hard for them to take ownership and pride.”

VanAire is excited to launch a tool this year that will allow core customers to obtain kit numbers, prices, basic design drawings, and applicable engineering standards through a customer portal 24/7.

The team believes this tool will revolutionize how it will interact with customers. Customers will also be able to track their personal quote history, tie it to history to specific project names, and easily communicate with their favorite VanAire salesperson.

Focusing on quality and continually improving processes has enabled VanAire to partner with leading manufacturers on noteworthy projects across the globe.
Kit Components Bring Quality, Safety, and Longevity to Equipment

VALVE AUTOMATION HARDWARE:
A CRITICAL PIECE OF YOUR PROJECT

As industries continue to implement global standards to increase safety, consistency, predictability, and other continual improvement necessities, elements such as mounting kits that may have once been considered commodity-type items are now moving to the forefront. ISO, API, MSS, ISA, WIB, and other international standard organizations have all identified the mounting kit of an automated valve assembly to be a critical component in the chain of elements and are creating new standards and/or making additions to current standards.

The Anatomy of a Locking Kit

Locking kits are used with automated valves to prevent valve rotation, i.e. “locking out.” This device is engineered to keep a valve in a locked position, either open or closed, even if an actuator is unintentionally engaged. This allows the maintenance team to safely and securely work on other parts of the system without concern that the valve will be accidentally engaged.

A LINK IN THE CHAIN

An automated valve assembly is an engineered product and should be treated as such. So all the components that are selected – the valve, the actuator, the bracket, the solenoid, the switchbox, etc. – should have been built to the same high standard and should be compatible with each other. A chain is as strong as the weakest link.

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EVOLVING STANDARDS

No longer an afterthought, the number of standards for mounting hardware are increasing exponentially.
There is a passage in the book Black Swan that illustrates the “Street-smart” term particularly well. Dr. John is an academic and Fat Tony is a street-smart guy. They both are asked the same question: assuming that a coin is fair and that it has given heads for 99 flips in a row, what is the chance of getting a head in the next flip of the coin? Dr. John says “Well, if the coin is fair, the probability is 50/50” – a mathematically sound response. When it comes to Fat Tony, he says: “99 heads in a row? No way this coin is fair!” FatTony knows that the probability of 99 heads in a row is something negligible for a fair coin. Although Dr. John’s answer is not wrong, it could get him in trouble if he decided to bet some money with the coin’s owner. The point of this little story is that sometimes we need more than theoretical knowledge to succeed in the real world. Take cavitation, for example. The physical mechanism behind this phenomenon must be understood, if one wants to avoid or correct a problem in a valve; but in most cases, this knowledge alone, is not enough. Put simply, some ways of addressing the problem stand a better chance than others. In this article, we will revise the theory behind cavitation and explore some street-smart ways of dealing with it.

**Cavitation in Valves**

If you have no idea of what cavitation is, look no further than your kitchen. Water being boiled offers a perfect example of what is happening inside valves and piping in an industrial environment. In boiling, vapor bubbles are formed at the bottom of the pot, where the temperature is higher (See Figure 1). These “cavities” eventually detach from the bottom and rise, increasing in size as the pressure diminishes towards the surface. At last, the bubbles reach the interface between liquid and air and either collapse – releasing water vapor in the air – or shrink (if the temperature is low enough). In short, it can be said that cavitation happens when vapor cavities appear inside an initially homogeneous liquid fluid.

In the kitchen, boiling happens at constant pressure. That is, the pressure at the bottom of the pot – where the conversion of water from liquid to vapor is occurring – remains fairly constant. Also, there is no damage to the pot as the bubbles collapse due to the low energy in the system.

Cavitation in valves is not often seen in constant pressure situations. Rather, it is mostly related to abrupt changes in pressure. These changes come frequently from variations in the diameter, such as constrictions caused by valves. According to Bernoulli’s principle, the fluid at the smaller diameter is flowing with higher velocities and lower pressures than the fluid at the bigger diameter. As in everything involving fluid dynamics, things are a bit more complicated than that – some effects, such as cavitation in valves, are also affected by this phenomenon; the question is always if the constriction caused by the valve is enough for the liquid to reach its vapor pressure. Figure 4 presents some examples of damage caused by cavitation in systems not well designed to deal with it. It is worth remembering that even if the valve’s destruction is deemed acceptable – due to maintenance constraints, for example, the damage caused by cavitation may go beyond the valve; the vibration levels, for example, may provoke fatigue cracks and failure in other piping components.

**Avoiding Cavitation Problems**

There are basically two ways of dealing with cavitation: either preventing it from happening or having materials suited to resist the additional wear provoked by it. Some typical solutions are discussed below.

1) **Selecting the Right Valve Type**

Different valve types usually display different cavitation performance for a given system. Manufacturers should be able to provide cavitation data for any of their products – control or block. Using the process conditions and the data provided by the manufacturer, one is able to choose the valve model best suited for the application. Figure 5 presents an example of a chart used for valve selection. Reference (3) has a summary of necessary calculation for valve selection.

When the process conditions are such that a more engineered valve is required, one common solution is to have a cage with several flow paths in parallel, each containing multiple constrictions. The rising movement of the valve plug uncovers new paths as it travels, which may have different geometries

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**Figure 1** – Water being boiled.

**Figure 2** – Illustration of the Bernoulli’s principle.

**Figure 3** – Implosion of bubble and impingement on wall. Image courtesy of SlurryFlo Valve Corp.

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Davi Correia, Senior Mechanical Engineer

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at the bottom and the top of the cage. The many turns inside the cage create a circuitous route designed to keep fluid speed below the limit deemed necessary for cavitation to happen. Figure 6 shows an example of such a cage.

2) Materials Selection
Sometimes the cost of avoiding cavitation at all flow conditions is too high and a more cost-effective strategy is to cover the affected surfaces of valve and piping with cavitation resistant materials. This does not eliminate the phenomenon; it only prevents erosion from damaging surfaces. Materials used for covering the surfaces have normally elevated hardness, such as the family of cobalt-chromium alloys known as Stellite.

Avoiding Cavitation Problems - The Street-smart Way
The solutions described above are sound - they work when correctly used. However, they may suffer from the same problem we saw in the introduction: lack of a bridge connecting them to the real world. The street-smart way is about learning the theory and then knowing how to best use it in a practical way.

The first – and most important rule – of the street-smart valve person is: do not trust the data until you have vetted it. In order to do this, you will need to understand the process. If it is a plant in design phase, talk to the process engineers and make sure you understand the assumptions made. Pay special attention to the minimum, normal and maximum flow conditions. Sometimes there are uncertainties about what the actual values will really be, and the process engineer tries to cover his/her back by using a wide range for them. This only shifts the problem for the valve, that now is supposed to deal with a wide array of process conditions.

Instead of trying to purchase an expensive all-encompassing valve, one option is to provide the piping with accommodation for an orifice plate down-stream the control valve. Orifice plates can be easily machined in several configurations and are a cheaper way of dissipating energy – the pressure drop in the orifice creates backpressure for the control valve, permitting it to have a large pressure drop without cavitation. They do wear out and require shutdown for their replacement – what may render them cumbersome for the operation. However, they provide a temporary “fix” until the process conditions settle, and the definitive control valve can be procured. Water injection in offshore production is a typical example of this situation. The conditions during the initial injecting phase tend to be more demanding than during posterior operation. This is because earlier oil production may create a “volume deficit” inside the reservoir, requiring water at a faster pace to reach equilibrium.

Even when the plant is already under operation, there is still a need to understand the process. Many plants lack adequate instrumentation to fully monitor fluctuations. Problems may range from the best solution is to buy a new control valve in case of failure, remember that the loss associated with an unplanned shutdown may be several times the cost of the valve. So there is no point in relying on the vendor offering a warranty. You do not want the valve to fail in the first place.

You will also need to understand the design criteria used in all the technical proposals you have received. It is not that you have to become a valve designer – although that would be good – but you have to have a minimum knowledge of the solution works, where it has been used and how easy it would be to modify it if things do not go as planned. Also, be aware of the possibility of solving one problem by creating another. For example, install a multi-flow cage as in Figure 6 and discovering afterwards that the flow paths get clogged frequently by corrosion debris.

REFERENCES

ABOUT THE AUTHOR
Davi Correia is a Senior Mechanical Engineer who has worked at a major Brazil-based oil company for the last 15 years. Correia is part of multi-disciplinary team that provides technical support for topside piping and equipment of production platforms. During this period, he began to work with materials and corrosion, and later moved to piping and accessories technology, where he has become one of the lead technical advisors on valve issues. Correia was part of the task force that revised the IDOG S-562 standard, and wrote the S-611 standard. Correia has a master’s and a doctor’s degree in welding by the Universidade Federal de Uberlandia.

Thankfully we have the largest inventory of Sambo gear actuators in the U.S. and Canada. And we can normally ship within 24-hours, keeping your downtime to a minimum. (Not to mention you looking like a hero!)

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Lee Co Releases 375 Spring Biased Shuttle Valve

The Lee Company has introduced the new 375 Spring Biased Shuttle Valve, which is the latest addition to Lee’s line of miniature spring biased shuttle valves. The metal components are constructed entirely of stainless steel for durability and long life. This new shuttle valve is ideal for high pressure applications with system pressures up to 5000 psi. The poppet in this valve is biased so that the emergency port (E) is normally closed, and the normal (N) and service (S) ports are connected. For added installation flexibility, the 375 Spring Biased Shuttle Valve is available with the biased port (Port E) at either end of the valve. Each spring biased shuttle valve is 100% tested and inspected to ensure reliable, consistent performance.

VZWP Servo Controlled Solenoid Valve from Festo

Festo’s new solenoid valve, VZWP, features a piston seal instead of a diaphragm seal, and has a maximum operation pressure of 40 bar. The use of a sealing piston instead of a diaphragm means that even high pressures can be controlled with a large nominal diameter. The valve closes automatically if power is lost. The VZWP is an ideal universal process valve for water, air, and neutral media.

The VZWP are 2/2-way valves, normally closed, and are piloted piston poppet valves. Units are made of brass valves with an option of nitrile rubber and fluoro elastomer seals. The valves come with either NPT or G threads. Sizes range from 1/2 to 1 inch, and the operating pressure is from 5.40 bar.

The valve can be operated wherever there is a pressure difference between the valve input and output. This includes applications where the medium is expelled into the open air or flows into an unpressurized container downstream of the valves. The VZWP is used for gaseous and liquid material flows up to a viscosity of maximum 22 mm/s in factory and process automation.

AUMA’s Flexible Platform for Intelligent Valve Automation

What do a fox and an electric valve actuator have in common? A lot, if the actuator in question is AUMA’s brand-new PROFOX. Like its namesake, PROFOX is not only cunning and adaptable but also extremely hardy. AUMA’s more than 50 years of experience developing and manufacturing electric actuators has yielded a high-performance actuator series with exciting new features and an excellent cost-benefit ratio. Aimed at applications requiring fast and precise positioning, utmost flexibility and future-proof interfaces, the smart and compact PROFOX series is suitable for all industry sectors, including water treatment, combined heat and power plants, process industries, and shipbuilding.

Built-in intelligence makes PROFOX equally suited to both simple open-close duties and challenging modulating applications. Motor speed is adjustable, ensuring fast and precise positioning without overrun. Soft start and stop function improves valve lifetime. Operating costs are low, thanks to high mechanical efficiency and low standby consumption. Innovative diagnostics ensure long-term availability and future-proof PROFOX actuators for IoT applications.

AUMA PROFOX actuators work with gate, butterfly, ball and globe valves. There are multi-turn versions for torques of 10 – 100 Nm and part-turn versions delivering 32 – 600 Nm. A linear actuator will follow soon. Modular design ensures flexible configuration, rapid delivery and consistent operation. Host system integration is equally flexible; PROFOX actuators support the most common communication protocols and are well prepared for future developments. Compact design allows PROFOX actuators to fit tight spaces.

The PROFOX series is engineered and built in Germany – and designed to last, even under the toughest process conditions. High-quality metal housing with IP67 protection (IP68 optional) and AUMA’s unique corrosion protection, which meets the highest CS-M/MCS-I requirements of EN ISO 12944-6, ensure that PROFOX actuators have a long life at temperatures from –30 °C to +70 °C. PROFOX actuators are simple and easy to use. Installation and commissioning are fast and convenient, using either the integral pushbuttons or an intuitive app. The FOX-EYE indicator light and a position indicator on the housing clearly show the actuator status at any time, even from a distance.

Valve World Americas features the latest in valve innovations, flow control products and a variety of valve components and accessories. If you would like to feature a product in an upcoming issue of the journal, please contact Sarah Bradley at s.bradley@kci-world.com.

Emerson has released the Daniel™ T-200, a titanium-housed transducer, for its gas ultrasonic flow meter product line, marking the use of metal 3D printing to enhance the acoustic performance of ultrasonic flow meters in custody transfer applications. The T-200’s robust design provides increased reliability, uptime and safety while achieving the highest accuracy class attainable in gas measurement.

To boost signal strength through the titanium housing, the T-200 uses a metal 3D-printed mini horn array, which maximizes the sound energy coupled in a range of operating conditions, including pressures from 15 pounds per square inch gauge (psi) / 103 kilopascals (kPa) to 3,750 psi / 25,855 kPa and temperatures up to 125°C / 257°F. Emerson has released the Daniel™ T-200, a titanium-housed transducer, marking the use of metal 3D-printed mini horn array, which is the latest addition to Lee’s line of miniature spring biased shuttle valves. The metal components are constructed entirely of stainless steel for durability and long life.
Large Diameter TBH Series Industrial Ball Valves
Now Available from Hayward Flow Control

Hayward Flow Control announced the launch of its market leading TBH Series True Union Industrial Ball Valves in Large Diameter Sizes. Now available in sizes 2–1/2” – DN65 through 6” – DN150, the TBH Series range provides Hayward customers with a complete range of sizes and key features. As with the TBH Series sizes up to 2” – DN50, the larger diameter valves continue to ensure protection of systems and operators with an integral lock-out plate that secures to the body of the valve. The new sizes also have an ISO 5211 actuator mounting bolt pattern as standard.

The new TBH sizes feature an integral footpad for easy installation on skids or panel mounts. Additionally, the larger diameter TBH Series now features a GF-PP (glass filled polypropylene) ergonomic handle for improved grip and comfort, as well as long term performance in demanding conditions. Available in PVC and CPVC materials, the large diameter TBH Series are fully pressure rated for 235 PSI / PN16 at 70°F / 22°C non-shock across all sizes and materials. End connection options include socket, threaded and flanged IPS, DIN/EN or JIS.

Key features, benefits and advantages include:

- GFPP Lockout/Tagout plate that secures directly to valve body for enhanced safety – standard
- Integral ISO5211 mounting flange – standard
- Permanent markings, eliminates labels
- Integral footpad for skid or panel mount
- Engineered Double O-Ring stem seal design
- Reversible PTFE seats – standard
- Direct replacement for existing Hayward TB Series
- NSF/ANSI 61 and 372 Listed
- Backed by Hayward’s Exclusive 3 Year Warranty
- Made in the U.S.A.

Assured Automation’s High Capacity Globe Control Valves

Assured Automation’s GH Series High Capacity General Purpose Globe Control Valves are constructed of rugged cast iron bodies. These valves provide excellent modulating control for pressure, temperature, level, and flow of a wide variety of fluids in from -20° to 400°F. They are available with a variety of plug styles and trim materials to suit nearly any application.

Features & benefits include:
- Bottom post guide adds stability allowing for higher pressure drops
- PEEK bearings provide low friction guidance and stability while protecting packing from debris ingestion
- Spring loaded V-ring packing has low friction and is self adjusting for maintenance free operation.

New Local Control Solution Available from Rotork

Suitable for all markets, the new Local Hand Station is an actuator control panel optimised to control actuators or field devices located in hazardous or inaccessible areas.

The Local Hand Station is suitable for applications such as large penstocks, where it is difficult to access the actuator due to height, in chamber applications where the actuator is located below the ground and space is limited or for control when the actuator/device may be in a hazardous location.

Reliable local control is essential in many applications and the Local Hand Station provides a simple control panel interface between the actuator or field device and the Distributed Control System (DCS). The Local Hand Station offers complete local override of DCS control signals to ensure localised maintenance activities can be performed safely without unexpected operation occurring.

CIRCOR Launches RTK REact EQ-L Electric Linear Actuator

CIRCOR International, Inc., a leading manufacturer of differentiated technology products and sub-systems, has announced the RTK® REact EQ-L electric intelligent linear actuator for high range force output. RTK REact EQ-L actuators are ideal for processes that depend on 100% running time, including industrial, chemical, and power applications. Corrosion-resistant variants have been specially designed for offshore applications. The REact EQ-L electric actuator offers an all in one intelligent package for applications with opening/closing forces from 15/3380 pound-force (lbf) to 30 kIo Newtons/6750 lbf.

The new REact EQ-L opens the door for Industry 4.0 functionality and flexibility for multiple signal exchange systems in open digital protocols for process automation. Outfitted with RTK’s optimized REpos digital positioner, the actuator offers data logging functions and remote control through Profibus or CANopen. Using field device notification of diagnostic status, users can expect to conduct timely, status-based intervention to promote higher system availability and reduced maintenance costs.

The new actuator makes it easy to replace old-school synchronous drive technology for industrial, chemical, power and process actuation requirements. Using the newest brushless DC (BLDC) motor system, REact EQ-L offers high force and delivers up to 60% energy savings compared to synchronous drives. Other cost-saving features include over-force protection to prevent damage to the valve and actuator; reduction in maintenance due to 100% running time; and external LEDs indicating actuating direction for easy monitoring. Also included is a smart controller with several adjustable and easily selectable preset speeds.

Approved for protection rating IP 66 and NEMA 4x, CE design and NRTL certification, REact EQ-L’s single gear unit-motor combination offers three different open/close force outputs; easy setup for worldwide voltage inputs and actuator protocols; and different speeds for different applications with only one motor and one gearbox.

CIRCOR Launches RTK REact EQ-L Electric Linear Actuator
LONG-TIME, RELIABLE, RUGGED A-T CONTROLS OFFERS THE NS SERIES

APPLICATIONS:
- Water Treatment
- Potable Water Service
- Reverse Osmosis
- Desalination

NSF 61 & 372 Certified

Relevant Industrial Announces John M. Carte as Chief Executive Officer

Relevant Industrial, a critical solutions provider, has announced John M. Carte as the Chief Executive Officer (CEO). Former CEO, Ben Andrews, will take on his new role as an Executive Board Member and continue to work directly with John.

John M. Carte brings over 30 years of industrial distribution experience to Relevant. During his 27+ years with MRC Global, he held positions in sales, operations management, marketing, supply chain, and executive leadership. As Senior Vice President for valves, automation, and instrumentation globally, John led the development and execution of the global strategy for the USD $1.9 billion segment, with direct responsibility for procurement and product business development. John joined Eads Distribution in 2015 as COO. Following the successful sale of Eads to FCX Performance, he was promoted to Division President of FCX Performance, and led the USD $180M+ Eads business unit, overseeing company sales and growth plans, strategic initiatives, marketing, finance, branch operations and supply chain. John joined Relevant Industrial in January 2020 as COO. Within a short time, he set his sight on operational excellence, a long-term strategic plan, and ways to capitalize on opportunities across the platform. John’s has an Associate’s degree in Management, a Bachelor’s degree in Marketing and an MBA in Organizational Leadership.

“I am humbled and honored to lead the team at Relevant Industrial, and I greatly appreciate the opportunity Ben and the Board of Directors have afforded me,” John noted. “It is a significant advantage to have Ben as my mentor, and I want to thank him for his support.”

PVF Roundtable Announces Rob Braig as Newest Board Member

Wolseley Industrial Group has announced Rob Braig, Vice President of Wolseley Industrial Group as the newest member of the PVF Roundtable Board of Directors. The PVF Roundtable is an organization of industry professionals involved in the Pipe, Valve and Fitting industry committed to providing an open dialogue to exchange relevant information, creating awareness of current industry affairs which affect the entire PVF community.

“The PVF Roundtable board is excited to have Rob join our group. His industry knowledge and experience will complement our board, and help us grow the organization,” said Sara Alford, President of the PVF Roundtable, and general manager, Newmans Valve.
Emerson announced it has completed the purchase of American Governor Company, a leader in technologies and services for hydroelectric turbine controls. The addition of American Governor builds on Emerson’s technology capabilities and expertise in the renewables and power industry.

Hydropower, the world’s largest source of renewable electricity, is generated by water running through turbines. American Governor’s solutions expertly control hydroelectric turbines, enabling utilities to provide reliable power generation that is highly responsive to the dynamic needs of the electrical grid.

“As the power industry builds on its renewables focus, having the right tools to effectively harness this natural energy is critical,” said Bob Yeager, President of Emerson’s Power & Water Solutions business. “This important addition of a highly-respected hydropower company will enable us to provide comprehensive solutions to our power customers, from generating consistent hydropower to providing the industry’s leading control system to safely and efficiently manage power operations.”

The power industry is increasingly seeking opportunities to introduce digital transformation technologies to help predict, manage and control electricity generation coming from disparate sources. American Governor’s digital governor controllers, which complement Emerson’s industry-leading Ovation distributed control system and RX3i programmable automation controllers, are helping the industry realize the benefits of digital transformation for more efficient, safe and reliable operations.

American Governor has an industry-leading hydropower solutions presence, with a global footprint exceeding 1,500 customer locations, and offers robust aftermarket capabilities with advanced customer service and training programs. American Governor is headquartered near Philadelphia and has about 50 employees.

Powell Valves will be moving facilities, after 174 years in the same location, so that its neighbor, KAO USA, can expand its facility.

KAO, a beauty products maker, plans to spend USD $35 million to expand onto the 3.3-acre Powell site. After months of negotiation, both companies have agreed to a deal brokered by The Port of Greater Cincinnati Development Authority.

Powell has agreed to sell its headquarters to The Port and use the proceeds to build a new facility on 4 acres of land that The Port owns just north of the former Sara Lee/Kahn’s manufacturing site.

The Port will allow Powell to remain in the facility until it can complete construction of the new facility. Once the project is complete, The Port plans to tear down the old Powell facility and hand the site over to KAO for redevelopment.

The Port’s board of directors approved a plan to acquire and improve the Powell site. To finance the acquisition, the board passed a resolution allowing The Port to issue up to USD $8 million in tax increment financing bonds.

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EGC Enterprises, an engineering and manufacturing company specializing in flexible graphite, has achieved certification from the Directorate of Defense Trade Controls (DDTC) as an International Traffic in Arms Regulations (ITAR) registered manufacturer, under ITAR Registration Code M41256. ITAR certification is the export control regulation which is overseen by the United States Department of State. It is used to control items on the U.S. Munitions List and the Missile Technology Control Regime Annex, and applies to defense-related applications for military end-use.

ITAR requires that all manufacturers receiving a customer request for defense articles must annually receive or renew an application with the DDTC and explaining the types of defense activities for which it will be involved and may not allow foreign nationals access to any data or information. It also requires that contractors and subcontractors working on component projects are ITAR compliant as well.

According to John Popovich, Vice President of EGC, “While EGC has long been in compliance with ITAR regulations, formalizing our registration opens up additional opportunities to serve the defense industry with our seals, gaskets and packings. Whether we are supplying seals for valves used on nuclear-powered aircraft carriers, or providing sealing components used on jet engines, we welcome the opportunity to work with customers that deal in ITAR controlled parts. Furthermore, we are especially proud to support defense related products that play a vital role in assisting the brave men and women of our armed services.”

Leonard Valve Company (Leonard), a leading designer and manufacturer of water temperature control valves and monitoring devices, and Bessemer Investors LLC (“BI”), the New York-based private investment firm, announced that BI has completed the acquisition of Leonard. Through this transaction, BI has partnered with Leonard’s existing management team to provide liquidity to selling shareholders and provide capital for supporting future growth initiatives. Financial terms of the transaction were not disclosed. Leonard’s management team, consisting of President E. Niles Wilcox and other executives, will lead Leonard going forward, and will retain a minority stake in the Company. Mr. Wilcox said, “Over more than a century, we have built a successful company serving our customers nationwide and our employees here in the Rhode Island community. Our partnership with BI will allow us to continue that success while positioning Leonard to execute on exciting new growth opportunities.”

Jeff Villing, Principal at BI, said, “We are excited to be partnering with the Leonard management team and to support their continued growth. The Company is widely regarded as an industry leader and is well positioned to continue building on its outstanding track record.”

Summit Valve Signs Distribution Agreement with WIKA

Summit Valve and Controls, the distribution and service of industrial and municipal valves and automation products announces the addition of WIKA Instruments Ltd. products to the company.

WIKA Instruments Ltd. provides process solutions for flow, level, pressure and temperature applications that offers a wide variety of digital communications for measuring and optimizing processes. WIKAIndo Instruments Ltd. customers come from a wide variety of industries, including petrochemical, potash mining, chemical, food & beverage, oil & gas, water & wastewater, power and life sciences.

This distribution agreement is effective immediately and offers a representation of all WIKA Instruments Ltd. products in all markets that it serves in western Canada. With headquarters located in Port Coquitlam, Saskatoon and Winnipeg, Summit Valve and Controls has been a key player in the western Canadian market for over 26 years.
Clarke Valve Closes USD $10million in Venture Funding

Clarke Valve completed the sale of USD $10million of Series C Preferred Stock to a group of investors led by YBA Kanoo Group (Kano).

Mr. Ali Abdulla Kanoo, President of the Kanoo Industrial & Energy division, said “We are delighted to announce this partnership with Clarke Valve, innovator of the world’s finest control valve technology, and a portfolio company of Saudi Aramco Energy Ventures. The synergistic relationship between Saudi Aramco, Clarke Valve, and YBA Kanoo is perfectly poised to capitalize on the rapid growth of the company, and the strategic vision of Clarke’s founder, Kyle Daniels.”

Kyle Daniels, President & CEO of Clarke Valve said, “We’re extremely grateful to YBA Kanoo, Mr Ali Abdulla Kanoo, and all of our investors. We believe Saudi Aramco and other producers in the GCC will generate strong demand for control valves over the long term and Clarke is now uniquely positioned to satisfy that demand. Clarke’s Shutter Valves have a proven track record with hundreds of successful field installations around the world. With their high flow rate, precise control, reduced emissions, low cost, and low operating torque, we believe our valves perfectly meet the needs of Aramco after going public and increasing production capacity. Clarke remains dedicated to our partnerships in the Americas and Europe, through Chevron and the Oil & Gas Climate Initiative. We also enthusiastically support Saudi Aramco’s In Kingdom Total Value Add (IKTVA) directives and Crown Prince Mohammed bin Salman’s directives under Vision 2030. Partnering with Kanoo will provide the final key for Clarke to begin large scale deployment in refinery applications within Aramco and the GCC. This should put us one step closer to our worldwide vision: To secure a significant share in the USD $84 billion industrial valve market with technology that can’t be matched.”

Spirax Sarco Appoints Next Chief Financial Officer

Spirax-Sarco Engineering plc, the world leader in thermal energy management, peristaltic pumping and associated fluid path technologies, has announced that Nimesh Patel will join the Board as Chief Financial Officer and Executive Director.

Nimesh will join Spirax Sarco before the end of July 2020 and will succeed Kevin Boyd as Chief Financial Officer and a member of the Board following completion of the interim financial reporting process, thereby enabling an orderly handover of duties.

Nimesh is currently Chief Financial Officer of the De Beers Group, which is majority owned by Anglo American plc. He has over 22 years of experience in senior finance roles including his role with De Beers and as Group Head of Corporate Finance for Anglo American plc. Nimesh intends to relocate to Cheltenham with his family.

On 11th March 2020, Kevin Boyd announced his desire to retire from the Board and the Group. Further details regarding the completion date of their handover, Kevin’s retirement date and Nimesh’s compensation will be provided when Nimesh joins the Group.

Commenting on Nimesh’s appointment, Jamie Pike, Board Chair, said: “I am delighted to welcome Nimesh to Spirax Sarco. Nimesh is a dynamic and highly capable Chief Financial Officer and I look forward to working closely with him as the Group progresses.”

Nicholas Anderson, Group Chief Executive, added: “I am delighted that Nimesh has agreed to join our team and continue the important work developed by Kevin. I am certain his experience, intellect and energy will bring many contributions and I look forward to developing with Nimesh the close working relationship I enjoy with Kevin.”
Ayo Kilani is the Mechanical Static Equipment Subject Matter Expert for Nigeria LNG Limited, a company incorporated as a limited liability company to harness Nigeria’s vast natural gas resources and produce liquefied natural gas (LNG) and natural gas liquids (NGLs) for export.

With global demand for LNG growing and several African nations (Nigeria, Cameroon, Angola, etc.) being very active in (offshore) oil and gas exploitation, the continent is likely to play a bigger role in the global LNG market, the continent is likely to play a bigger role in the global LNG market, with several African nations (Nigeria, Cameroon, Angola, etc.) very active. Valve World has interviewed Kilani regarding various topics within NLNG. One of these topics is worker and environmental safety. Although NLNG indicates its HSE-performance has improved significantly over the past years, the company still sees room for improvement. To guarantee safe working conditions, related equipment – valves included – needs to be more reliable.

The key task and challenge of my highly experienced team remains the establishment of robust programs and strategies which are aligned to delivering overall business objectives on safety, utilization, availability and reliability,” he says.

**Health Status Valve Park**

The ‘health status’ of NLNG’s valve park is vital to Kilani and his team. Approximately 5,000 actuated valves and 38,000 manual valves, including pressure relief and non-return valves, are installed in NLNG’s plant complex. Given the age of some of its assets, NLNG experiences some challenges related to valves.

Kilani: “The NLNG Plant complex has been in operation for about 20 years and some valve failures that resulted in production losses were experienced in recent years. The dominant failure modes on the actuated valves are associated with the instrumentation accessories on the valves, which fail after several years in operation, e.g. air regulators, valve positioners, and SOVs. We have also experienced other failures regarding the hard parts (trim assembly, stem, and bushings). Some failures were age-related, and others random.

**Transition**

To address the above issues, Kilani’s team developed a valve maintenance strategy for safety and production-critical actuated valves and, subsequently, accompanying the implementation of the strategy by the maintenance team.

“‘This campaign is still ongoing, but we have seen significant benefits from the exercise with about 50% reduction in production losses from critical actuated valve failures.”

According to Kilani, the strategy mentioned above involves mostly the implementation of time-based maintenance. However, the company has commenced pilot studies to transition to a condition-based maintenance strategy. “We are testing solutions proposed by some OEMs on a few critical valves before deciding on one and scaling up. This is intended to monitor deterioration in the different valve assembly components to enable us to identify the onset of failures and plan interventions before total failure occurs.”

**Smart Instrumentation**

To facilitate condition-based maintenance, NLNG is installing smart instrumentation and plans to incorporate other technologies that will enable the site to monitor and predict the conditions of critical actuated valves for a more strategic lifecycle approach to valve management. “We are also finalizing a similar maintenance strategy to improve the reliability of manual valves that are installed in our plant complex.”

Other focus areas regarding valves involve the reduction of fugitive emissions, e.g., gland packings and lead time/availability of spare parts for valves monitoring, considering the remote location of the plant in Bonny Island.

Kilani: “The following strategies are critical: a strategic direction to deliver reliability of actuated and manual valves, including pressure relief and non-return valves, are installed in NLNG’s plant complex. Given the age of some of its assets, NLNG experiences some challenges related to valves. The key task and challenge of my highly experienced team remains the establishment of robust programs and strategies which are aligned to delivering overall business objectives on safety, utilization, availability and reliability.”

“By Lucien Joppen

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**Ayo Kilani (NLNG)**

**Chairman Valve World Conference 2020**

Valve World is honored to present Ayo Kilani as the Chairman of the Valve World Conference 2020. The main global event for the valve and actuation sector and related end-user sectors will take place from December 1st to December 3rd in Düsseldorf, Germany.

Ayo Kilani is the Mechanical Static Equipment Subject Matter Expert for Nigeria LNG Limited, a company incorporated as a limited liability company to harness Nigeria’s vast natural gas resources and produce liquefied natural gas (LNG) and natural gas liquids (NGLs) for export.

With global demand for LNG growing and several African nations (Nigeria, Cameroon, Angola, etc.) being very active in (offshore) oil and gas exploitation, the continent is likely to play a bigger role in the global LNG market, with several African nations (Nigeria, Cameroon, Angola, etc.) very active.

Kilani subsequently led the mechanical and civil engineering teams in the design office for plant change projects and later became Area Maintenance Coordinator/Supervisor for the LNG trains. “I was also involved in the construction, commissioning, and start-up phases of the project.”

Kilani: “The following strategies are critical: a strategic direction to deliver reliability of actuated and manual valves, including pressure relief and non-return valves, are installed in NLNG’s plant complex. Given the age of some of its assets, NLNG experiences some challenges related to valves. The key task and challenge of my highly experienced team remains the establishment of robust programs and strategies which are aligned to delivering overall business objectives on safety, utilization, availability and reliability.”

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Valve World spoke briefly with Ayo Kilani on his chairmanship of the Valve World Conference 2020.

First of all, your reaction to the chairmanship of the event?

“I was pleasantly surprised to receive the news of my nomination to chair the Valve World Conference 2020. I attended the conference for the first time in 2016, following a recommendation by a valve subject matter expert who works for one of our shareholder companies. Prior to that time, I had led a team in my current organisation to develop a valve maintenance strategy for our critical valves and felt the need for other insights to further shape the strategy for flawless implementation.”

What can you bring to the conference?

“Hands-on experience working with OEMs and maintenance contractors from an end user perspective in developing a fit-for-purpose valve maintenance strategy to improve plant reliability and minimise occurrences of leaks and fugitive emissions. I recall views expressed by some participants from previous conferences that I attended on the importance of regular quality feedback from end-users in the industry to drive innovations and improvement in the life cycle performance of the various products.”

What are your expectations from the event?

“A key expectation for me at this year’s conference is for participants to showcase products, services, and to share insights to help the various businesses achieve lower CAPEX and OPEX in the face of the significant drop in oil and gas prices in the international market.”

Which topics should be discussed from a LNG standpoint?

“It would like the following topics to be discussed from the LNG gas industry standpoint: condition based maintenance / monitoring of on-off and control valves, fugitive emissions, design / maintenance perspectives, the replacement of valves instrumentation accessories online without disruptions to valve function, solutions to free stuck valves / replace without impact on production, the reduction of cost of ownership, and motor operated valves and hydraulic operated valves reliability / maintenance.”

More information on the Valve World Conference: www.valve-world.net/vw2020/

Dedicated Team

The last issue is high on the company’s agenda, Kilani says, and the company is certified to ISO 14001-2015 (Environmental Management system) and ISO 50001-2011 (Energy Management system). “We are committed to protecting the environment and use materials and energy in an efficient manner as stated in our HSE-policy. HSE is managed as a critical business activity, and there is a strong focus and strategy to reduce emissions and leaks in the plant. Our safety slogan on this is ‘Zero means zero’, meaning zero incidents, zero leaks.”

Besides attending to existing equipment, Kilani and his team also provide support on new project development. For the near future, Train 7 is in the pipeline as the shareholders of the company took FID on the project in December, 2019. This expansion project, when completed, is expected to increase the LNG production output of the complex from 22 million tons per annum to 30 MTPA.

Reliable, Integrity and Available

Regarding the involvement in procurement for the operating plant, Kilani’s team provides engineering specifications for valves that are procured for maintenance activities. “The specifications are in line with design engineering practice, industry standards, and local regulations where applicable. The top three items of importance to us when it comes to valves management are: a reliable performance, integrity and the availability of spare parts for maintenance in life cycle.”
A week after the parade, there were no available beds in any of Philadelphia’s hospitals and 4,500 people were dead. When the disease finally subsided, the final death toll for Philadelphia was around 60,000. Worldwide, some sources say the final death toll for the Spanish Flu pandemic was around 40–50 million, but this number includes deaths from other causes, and the exact number is uncertain. The peak of the pandemic occurred between October and December 1918. The last two “waves” of the pandemic were less deadly, but the disease continued to spread until June 1920.

The Valve Market Before the Coronavirus

At the end of 2019, the global industrial valve market had a value around USD $75 billion and it included mainly the following valve types: gate, globe, ball, butterfly, and check valves. The market was estimated to grow at a CAGR (Compound Annual Growth Rate) close to 3.6% and reach a value of USD $93 billion by 2026. Figure 1 breaks down the market share of different valve types for the American sector.

The main end users for industrial valves are: Oil & Gas, Chemical, Water & Wastewater treatment, Power plants, and Paper & Pulp. The relative distribution of the market can be seen in Figure 2. To face the increasing demand, manufacturers are expected to gain a greater foothold in plants from all segments. Countries experiencing fast rates of urbanization may also require valves for projects involving water and wastewater treatment, as the constant flux of immigrants puts a strain on a city’s infrastructure. These projects may range from simple upgrades on existing facilities to large plants with the capacity to serve millions of people.

Economic Effect of the Spanish Flu Pandemic

A pandemic is an epidemic of infectious disease that has spread across a large region, for instance, multiple continents, or even worldwide. The word pandemic comes from two Greek words: ‘pan’ meaning all and ‘demos’, meaning people. The Spanish flu pandemic lasted from the beginning of January 1918 until December 1920 and it may have killed up to 100 million worldwide, what translates to, roughly, 3% to 6% of the entire global population. Today, there is a certain consensus that the pandemic had three distinct “waves”, with the second wave at the fall of 1918 being the deadliest in the U.S. (about 560,000 to 675,000 people). Despite what you might assume, the first recorded case of the Spanish flu did not occur in Spain as its name would have you believe, but instead closer to the American heartland in Kansas. As Spain was not in World War I, its press was uncensored. It was named ‘Spanish’, because the earliest reports came from there.

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Figure 1 - U.S. industrial valves market share by product, 2012 - 2022 in USD Million

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Figure 2 - Relativ distribution of the Valve Market

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The pandemic killed mostly young adults, not the elderly or the children, as is common with the customary strains of influenza. Most victims were in the age interval of 15-40 years old, which caused a labor supply shock. This caused a market adjustment: wages for skilled workers went up and migration played a significant role in balancing labor shortages in different regions. Also, many people previously unemployed found the opportunity because of the pandemic.

That is not to say that the economy did not suffer. A recent article estimates that is not to say that the economy did not suffer. A recent article estimates that the 1918 Flu Pandemic led to an 18% reduction in state manufacturing output for a state at the mean level of exposure. Exposed areas also saw a rise in bank charge-offs, reflecting an increase in business and household defaults. These patterns are consistent with the notion that pandemics depress economic activity through reductions in both supply and demand.

In order to offer a glimpse of the society during the period, the following information was published in local U.S. newspapers at the time:

• Merchants in Little Rock say their business has declined 40 percent. Others estimate the decrease at 70 percent.
• Little Rock businesses are losing $10,000 a day on average ($123,500 in 2006 dollars). This is actual loss, not a decrease in business that may be covered by an increase in sales when the quarantine order is over. Certain items cannot be sold later.
• Fifty percent decrease in production reported by coal mine operators.
• Coalfield, Tenn., with a population of 500, has “only 2 percent of well people.”

World War I was not fought in American land, so there was no damage to infrastructure or industry, as opposed to Europe. To have an idea of how long the recovery took, Figure 3 shows the variation on the Dow Jones Industrial Average (DJIA) stock market index. The DJIA is determined by tracking 30 companies representative of the industrial sector. Figure 3 shows that from January 1918 until December 1920 (lowest point), the index had a drop of 35%. The January 1918 level was not to be reached again until February 1922, a little more than three years later.

The recovery rate was not the same for every state in the U.S. Another recent study has proposed that cities that had earlier and tighter lockdown policies had a faster recovery than cities that tried to “preserve” the economy. Figure 4 shows the relation between increase in manufacturing employment and mortality rates for several cities. Taking the increase in manufacturing employment as a proxy for recovery, the picture tells us that stronger and earlier measures – social distancing, closures of places of gathering, etc. – helped the economy to bounce back faster.

Where Do We Go From Here?

Recent pandemics have been disruptive for the economy, but the disruption they cause tended to occur more in delaying growth than in substantially altering the pillars sustaining a society’s way of life. In other words, their effects are different from the ones caused by a war, for example. Wars may also kill millions, but they also destroy infrastructure – to the point of throwing the loser back to the Stone Age – and the winner may impose new laws that alter the fundamental economics of the pre-war period. This changes the “rules” by which a society functions.

The previous reasoning leads to expect that the scenario for the valve market depicted earlier in this article is not so much altered by the coronavirus pandemic as it is delayed. This is the optimistic scenario; one that largely relies on how long the pandemic will last. The pessimistic scenario takes into account some geo-political movements that were occurring before the pandemic and that may accelerate these movements.

Let’s start with the optimistic scenario. There is no way to be certain about how long the pandemic will last. Some signs, however, are trustworthy indicators that things are improving and can be tracked to monitor how close we are from starting to loosen up measures such as the lockdown. The list below is not definitive, but it offers a good start:

• Hospitals must be able to safely treat all patients requiring hospitalization, without resorting to crisis standards of care.
• A city/state/country needs to be able to test at least everyone who has symptoms.
• The city/state/country is able to conduct monitoring of confirmed cases and contacts.
• There must be a sustained reduction in cases for at least 14 days (as the symptoms may take up to two weeks to emerge).
These signs are not likely to appear at the same time at different places. Most probably, regions where stricter social distancing measures were enforced earlier will return to normality sooner. The disease generally decreases when enough people develop immunity, either through infection or vaccination. Implicit in the optimistic scenario is the assumption that, once we reach this point, the world picks up the pace where it was left. Industry and trade slowly resume, with some adaptations needed for supply chains and markets in places still struggling with the disease.

The pessimistic scenario also needs the disease to subside, so the signs listed in the optimistic case still apply. Now, for the differences. The first possible impediment to a business-as-usual case after the pandemic is controlled, is the oil price. The oil price began an unprecedented drop in January 2020, before the pandemic is controlled, is the prelude to a business-as-usual case for the differences. The first possible implication is that, once we reach this point, the world picks up the pace where it was left. Industry and trade slowly resume, with some adaptations needed for supply chains and markets in places still struggling with the disease.

The second menace is more complex. For smaller projects that require relative-long order booking time and consequent reduction in economic activity, oil stocks surged. Contracts for large oil projects tend to be signed years in advance of the physical construction. So, the need for valves will probably still be there when the situation improves. For smaller projects that require relatively less complex infrastructure – such as shale gas – the oil price may prove more “deadly” than the coronavirus. Orders for maintenance - will likely also suffer, as many production installations are “deadly” than the coronavirus. Orders related to these small projects - as well as for maintenance - will likely also suffer, for many production installations are being shut down until oil stocks go back to normal levels.


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As many business operations have been shutdown to lessen the spread of the COVID-19 pandemic, only businesses deemed essential have continued operations. It has been proven that components such as valves are necessary to continue operations in the most critical processes. Manufacturers, distributors and end users are now finding ways to work through the uncertainty and give support wherever it is needed. Many valve companies and others in the industrial sector have opened new support channels during the COVID-19 outbreak to get their customers the help they need, are delivering technologies used in aiding the sick or have altered their manufacturing focuses to provide new materials to support in the pandemic effort.

VMA Advocates Valve Industry’s Vital Contribution to Essential National Infrastructure

The Valve Manufacturers Association of America (VMA), in a letter to Vice President and Director Kroha of the Department of Homeland Security’s Cybersecurity and Infrastructure Security Agency, calls for the recognition of its members as an essential industry during the nation’s critical infrastructure workforce amid the COVID-19 pandemic.

VMA member companies manufacture and distribute industrial valves, actuators and components that are vital to the nation’s infrastructure and process industries. The valve, valve actuation, and automation industry performs a critical role supporting countless processes and services essential to our nation. These companies must continue operating to ensure the delivery of products and services from the water & wastewater, healthcare, energy, defense, chemical processing, food & beverage & pet, and other critical sectors.

“Our industry is taking aggressive steps to ensure we can continue operating in a manner that protects the health and wellbeing of our workforce and community,” says Heather Rhoderick, VMA President. “It is important we provide information, tools, and support to help our members navigate this crisis.”

Swagelok Donates USD $100,000 to Nonprofits During COVID-19

The Swagelok Foundation has announced that it is donating USD $100,000 to help sustain direct-service nonprofit organizations who are facing a sudden increase in economic and medical needs.

The gift will be distributed among six local nonprofit organizations that have designated programs in place to support the area’s most vulnerable citizens during the COVID-19 pandemic. The recipients are Cleveland Foundation: COVID-19 Rapid Response Fund, Greater Cleveland Foodbank, Boys and Girls Clubs of Cleveland, American Red Cross—Northeast Ohio, May Dugan Center, and United Way of Lake County.

“COVID-19 is the largest global crisis we have faced in our generation, and we don’t yet know what the full ripple effects of this pandemic will be. While local and state leadership mandate the necessary policies to keep our communities stable and safe, the members of the Swagelok Foundation believe it is important to support our nonprofit peers, who are providing essential services to those affected by the coronavirus,” said Chris Miklich, Swagelok Company Chief Financial Officer and President of the Swagelok Foundation.

The Swagelok Foundation was established as a charitable organization in 2000 and is dedicated to supporting the communities in which Swagelok associates live and work.

Emerson Prioritizing Pandemic Support

Emerson’s U.S. plants are all operating, and the company is at 80% of capacity worldwide. The company has begun to run plants to prioritize medical production as well as to produce medical equipment and protective gear for healthcare workers to help address shortages in the fight against the coronavirus.

Companies like Emerson’s ASCO and AVENTICS divisions continue to step up production on key technologies used in life sciences and laboratories, including ventilators, respirators, hospital beds and testing equipment, among others. Pneumatic valves are crucial to breathing treatment devices, including ventilators and ASCO and Aventics technologies are used heavily in these design and the manufacturing. Drug production will also see added use of the company’s 273 pinch valve as well as angle body valves, cylinders, FRLs, and total automation from the AVENTICS side.

BP will donate its significant supercomputing capability to the public-private consortium formed in March 2020 by the White House’s Office of Science and Technology Policy, the U.S. Department of Energy and IBM. The group, known as the COVID-19 High Performance Computing Consortium, will pool resources and expertise from Amazon Web Services, Google Cloud, Microsoft, Hewlett Packard Enterprise, BP and others. They aim to provide COVID-19 researchers worldwide with access to the most powerful high-performance computing resources that can significantly advance the pace of scientific discovery in the fight to stop the virus.

BP will provide access to its Center for High-Performance Computing (CHPC) in Houston, which houses one of the world’s largest supercomputers for commercial research and processes enormous amounts of data for BP. It has 16.3 petaflops of computing capability, allowing it to process more than 16 million billion calculations per second and complete a problem in an hour that would take a laptop nine years. The Center’s staff includes experts in data science, applied mathematics, and systems architecture.

Researchers are invited to submit COVI-D-19 related research proposals to the Consortium via the online portal, which will be reviewed and matched with computing resources from one of the partner institutions. An expert panel of top scientists and computing researchers will work with proposers to quickly assess the public health benefit of the work and coordinate the allocation of the group’s powerful computing assets and resources.

The sophisticated computing systems available through this consortium can process massive numbers of calculations related to bioinformatics, epidemiology, and molecular modeling, expected to help scientists develop answers to complex scientific questions about COVID-19 in hours or days versus weeks or months.

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Opportunities and Challenges in Safety Integrity Levels

With the initial phases of safety in asset integrity management systems like HAZOP (hazard and operability study) and SIL (safety integrity level) assignments completed and most of the engineering documentation available, the next important activity in the safety lifecycle is SIL verification. There is a common perception that the SIL verification is a straightforward activity computing reliability data and checking that target SIL is met.

By Gobind Khiani - Consulting Fellow-Piping/Pipelines

As the engineer starts SIL verification, it is soon realized that the data is inadequate; the SIL assessment report is not clear enough and stumbles around multiple roadblocks. We have seen this closely for several projects and noted some of the aspects where the challenges are commonly observed. Some of the challenges are related to the design of the process itself and some challenges are related to execution of the project and documentation. These observations are listed below:

- The design of the equipment and operation philosophy is developed relying much on SIS (safety instrumented system) rather than following an inherent safety design approach. You may wonder how it affects the SIL verification. Higher reliance on the SIS means it would result in higher SIL ratings. The verifier would have to add up to the instruments to meet typically higher SIL. In a typical lump sum project, this might be a good impact and generally the blame is passed on to engineer running the SIL verification tool.
- Design of the process and selection of equipment should take into consideration the inherent safety in design.
- Documents such as C&E (cause & effect) narratives many times do not sufficiently address the SIF (safety instrumented function) requirements. Implementing a good SRS (safety requirement specification) and hence completing the SIL verification becomes a challenging task.
- The clear definition of the hazard and consequence should be clearer to indicate what exactly the consequence is.
- E.g. Requirements of process safety time with basis should be documented.
- Clear definition of actions required to mitigate the risk is required, e.g. the primary actions sufficient to mitigate the risk and secondary actions following the primary actions are mixed resulting in voting on final elements like 2oo2, 3oo3. This architecture for final elements is difficult to meet the target SIL, especially the SIL 2 and SIL3.
- Many a times, the HAZOP and SIL assignment study findings and discussions are not recorded appropriately. The clear definition of the hazard and consequences are not properly captured. The SIL verifier does not attain the confidence of the design. SIL verification often is thought of just completing the calculations for checking that intended SIL is met. But without proper definitions of hazard and consequence, though mathematical SIL verification calculations might indicate the requirements are met, the validation of the design would be a difficult task.
- The team participating in HAZOP and SIL should document the findings more precisely. E.g. 1 - High Pressure Trip on Extractor causes plant shutdown. E.g. 2 – LAHH1001 causes closure of FCV2021. The definition of the consequence should be clearer to indicate what exactly the consequence is.
- The participation of the SIS engineer in the early phases of the lifecycle would mitigate this to a good extent.
- The important activity in SIL verification is collection of the reliability data for all chosen instruments and the logic solver. Though the logic solver data is generally available, getting proper and certified reliability data for instruments is always a challenge.
- There should be close coordination between the instrument engineer procuring the instruments and SIL verification engineer.
- The selection of the instruments should be done based on the detailed evaluation of the reliability data (certificate, associated report, and safety manual).
- The SIS engineer should check the project philosophy to determine whether it allows to use the instruments which are certified based on proven in use / prior use criteria.
- Inputs to SRS like turnaround period, testing interval, common cause failure rates, and coverage factor considerations are generally not available in client specifications.
- The SIS engineer should ensure that this data is captured in SRS based on documented discussions with client.
- Many times, higher perception of risk during HAZOP and SIL assessment result in higher SIL ratings.
- To avoid conflicts and endless debates between the client, contractors and licensors, the documents establishing the criterion of loss to
the personnel, environment and as-
sets should be properly established.
• Loss of production is always a point
of debate and it should be clearly es-
tablished in the SIL assessment pro-
cedure to keep this out, unless the SIL
is designed with this intent.
• Establish clear criteria for conse-
quence before the SIL assessment
phase. E.g. Severity definitions like
slight injury, minor injury, and perma-
nent disability or up to ‘y’ fatalities,
should be clearly described with no-
table differences in each consequence.
• The competence of the engineer per-
forming the verification is an impor-
tant aspect. The SIL verification ac-
tivity not only requires competence
with respect to Functional Safety and
should have fair understanding of the
logic solvers and field instruments.
The engineer should be in a position
to understand the details and restric-
tions of use mentioned in the instru-
ment certificates and reports.
• E.g. the reliability data of valves
may contain different failure rates
based on service, like clean service
or toxic service. The verification
engineer should understand the
process and any such criterion.
NOTE: A SIL rating applies to the whole
safety instrumented function (SIF) in-
cluding the final element.
The definition from IEC61511. 3.2.68
safety function : function to be imple-
mented by an SIS, other technology
safety related system or external risk,
reduction facilities, which is intended
to achieve or maintain a safe state for
the process, with respect to a specific
hazardous event.
A prominent example on SIL as ex-
plained here, F&G (fire & gas) systems
are not normally considered to have a SIL
rating, but a reliability calculation of the
F&G components rather than the “full”
SIL rating. If the operation stops at the so-
lenoid valve then the SIL is not complete.
The final result is water at the required
pressure coming out of the valve.
In fact you would also have to include the
reliability of the water supply to the
system (for example a pump, and as-
associated equipment) should one want
a “full” SIL rating of the system. A SIF
needs to consider an action that re-
moves the hazard. The problem is that
while reliability is a component of a SIL
rating it is not the sole consideration.

Additional Things to Consider
During SIL Requirements
When discussing safety requirements, it
would be prudent for anyone work-
ing with SIS to read section 10 of the IEC
61511 - 2016 Part I. There are many factors
that are needed to be specified for a SIF,
for example tight shut off. A SIF should be
prepared for use at HAZOP etc.
It is important for control system ex-
erts to ensure that an experienced
safety integrity functional engineer,
such as an instrumentation and con-
trol system engineer, is present at the
HAZOP. She/he needs to capture as
much information as possible about the
potential safety functions, regardless of
what the HAZOP scribe is capturing.
Further, SIL Verification activity must
not be used to reverse engineer a safety
function. Some engineers think that it
is okay to assign a SIL rating as long as
it passes the SIL Verification. There are
more activities (and associated cost) af-
fer SIL Verification so we need to care-
fully assign the right SIL rating for a
safety function.
Competent engineers must review the
SIL Certificates during the Technical Bid
Evaluation of SIF components. SIL Veri-
fication may happen after the SIF com-
ponents have been purchased. Many
times, the SIS engineer performing the
SIL Verification is stuck with what the RE
(Responsible Engineer) has purchased
and this can bring huge challenges, es-
specially on a lump sum project. SIL Cer-

References:
• Understanding SIL Certificates by SIRA Certification.
• Bureau Veritas-SIL Capability Introduction
• SIL made simple by Michael K. Mitchell
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• Industry codes and practices author participates.

DISCLAIMER:
The article is written/edited by the author to best of his/
her knowledge including enough references provided at
the time of writing this, to meet best industry practice.

ABOUT THE AUTHOR
Gobind Khiani, M.Eng., P.Eng. has served in engineering and
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He is a past chairman of Calgary Branch Executive Commit-
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and Valve Users Group and Vice Chairman of International Standards Organiza-
tion, representing Canada.

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www.valve-world-americas.net • May 2020 | Valve World Americas
The United States valve market is going to shrink in 2020 and will not return to 2019 levels for several years. The impacts of COVID-19 will be substantial. Many aspects are difficult to predict now, therefore market forecasts will need to be updated continuously.

By Robert McIlvaine, President & Founder, The McIlvaine Company

U.S. chemical sales are expected to fall 3.3% in 2020 before rising 5.2% in 2021. Anticipated declines reflect struggling end-use markets and export customers for U.S. chemistry products.

Partially offsetting weakness in U.S. chemical production is the strengthening demand for chemicals used in the response to COVID-19. Among the many chemistry solutions used in the fight against the virus are synthetic materials for personal protective equipment (PPE), ingredients for cleaners and disinfectants, and plastics used in medical equipment such as ventilator machines and IV bags.
The oil and gas industry accounts for a large part of the market. With demand falling and the pricing policies of Russia and Saudi Arabia, the activity in the shale regions of the U.S. will be sharply curtailed. However, in a few years when the corrections set in, the U.S. will again become the leading producer.

Workers at Marathon Petroleum’s refinery in Gallup, N.M., are turning off the valves. Oil companies in West Texas are paying early termination fees to contract employees rather than drill new wells. In Montana, producers are shutting down wells and slashing salaries and benefits. The oil industry has lived through many booms and busts, but never before have prices collapsed as they have in recent weeks.

Large oil majors such as ExxonMobil initially slashed 2020 capital spending budgets by 30% or more and with the falling prices, are continuing with further cuts. Many smaller oil companies are expected to seek bankruptcy protection in the coming months after having spent years borrowing billions of dollars to extract and move crude.

Oil companies generally employ service companies to do their drilling and fracturing, and so the downturn is particularly painful for those engineering, procurement and construction businesses. Service companies have slashed payrolls and budgets in recent weeks.

The impact on the food market will be negative in the short term, as the supply chain is interrupted by closing of a large number of food processing plants due to the coronavirus. On the other hand, the investment in automation will accelerate in coming years due to the high cost of labor. The cost per labor hour will rise substantially due to coronavirus prevention and healthcare costs.

These automated systems will require substantial numbers of valves and existing manual valves will be automated.

Oil companies are working on protocols to allow industry to safely return to work[1]. If this is successful and/or a vaccine is quickly created and produced the impact of the virus will not be so severe.

REFERENCES:

### Percent of the 2019 Market Held by Each Industry

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<th>Industry</th>
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Projects & Tenders!

In this section you will find a listing of recent new Projects happening in the market & latest valve and valve related Tenders for the Americas.

Canada – British Columbia: Pipes, Valves and Fittings
Description: Pipes, Valves and Fittings
Contact point: +1-250-363-8000
Time limit for receipt of tenders or requests to participate: June 2, 2020
Language in which tenders or requests to participate may be drawn up: English, French

Canada – Alberta: Pipes, Valves and Fittings (W0142-20X011/A)
Description: Pipes, Valves And Fittings (W0142-20X011/A)
Contact point: (306) 241-2826, nancy.baessler@tpsgc-pwgsc.gc.ca
Time limit for receipt of tenders or requests to participate: June 2, 2020
Language in which tenders or requests to participate may be drawn up: English

Canada – British Columbia: Valve, Linear, Directional Control (W8482-217764/A)
Description: Valve, Linear, Directional Control (W8482-217764/A)
Contact point: eric.bouquin@forces.gc.ca
Time limit for receipt of tenders or requests to participate: June 8, 2020
Language in which tenders or requests to participate may be drawn up: English

United States – Pennsylvania: Valve Bleed Turbine
Description: Valve Bleed Turbine
Contact point: daria.wilson@dla.mil
Time limit for receipt of tenders or requests to participate: May 26, 2020
Language in which tenders or requests to participate may be drawn up: English

United States – Pennsylvania: Valve Flow Control
Description: Valve Flow Control
Contact point: eric.r.hopkins1@navy.mil
Time limit for receipt of tenders or requests to participate: May 22, 2020
Language in which tenders or requests to participate may be drawn up: English

THE NEW PROFOX ACTUATOR

One solution for butterfly, ball/plug and globe valves
Compact design covering a wide power range
High plant visibility thanks to intelligent diagnostics
Low cost of ownership combined with high energy efficiency
A future-proof actuator adaptable to changing demand
The U.S. Department of Energy (DOE) Office of Fossil Energy announced up to USD $131 million for carbon capture, utilization, and storage (CCUS) research and development (R&D) projects through one new funding opportunity announcement (FOA) and the winners of five project selections from a previous FOA.

Under the new FOA, Engineering-Scale Testing from Coal and Natural-Gas-Based Flue Gas and Initial Engineering Design for Industrial Sources, DOE is making up to USD $46 million available for cost-shared R&D projects that capture and store carbon dioxide (CO₂) emissions from industrial sources. CCUS is often viewed in the context of power production. However, capture and storage of CO₂ from industrial sources is also vitally important to reducing greenhouse gas emissions.

Selected projects will support engineering studies of carbon capture systems for industrial sources and testing of advanced carbon capture materials, processes, or a combination of advanced materials and processes for fossil fuel energy plants. The projects will fall under two areas of interest: (1) Initial Engineering Design for CO₂ Capture from Industrial Sources; and (2) Engineering-Scale Testing of Transformational Post-Combustion CO₂ Capture Technologies.

Under the previously announced FOA, Carbon Storage Assurance Facility Enterprise (CarbonSAFE): Site Characterization and CO₂ Capture Assessment, DOE selected five projects to receive USD $85 million to accelerate the wide-scale deployment of CCUS technologies. The projects selected under this FOA will assess and verify safe and cost-effective commercial-scale geologic storage sites for anthropogenic CO₂ emissions; and assess the technical and economic viability of carbon capture or purification technologies for sources that will supply CO₂ to the storage sites.

The U.S. Department of Energy’s (DOE’s) Office of Fossil Energy announced up to USD $131 million for carbon capture, utilization, and storage (CCUS) research and development (R&D) projects through one new funding opportunity announcement (FOA) and the winners of five project selections from a previous FOA. Under the new FOA, Engineering-Scale Testing from Coal and Natural-Gas-Based Flue Gas and Initial Engineering Design for Industrial Sources, DOE is making up to USD $46 million available for cost-shared R&D projects that capture and store carbon dioxide (CO₂) emissions from industrial sources. CCUS is often viewed in the context of power production. However, capture and storage of CO₂ from industrial sources is also vitally important to reducing greenhouse gas emissions. Selected projects will support engineering studies of carbon capture systems for industrial sources and testing of advanced carbon capture materials, processes, or a combination of advanced materials and processes for fossil fuel energy plants. The projects will fall under two areas of interest: (1) Initial Engineering Design for CO₂ Capture from Industrial Sources; and (2) Engineering-Scale Testing of Transformational Post-Combustion CO₂ Capture Technologies. Under the previously announced FOA, Carbon Storage Assurance Facility Enterprise (CarbonSAFE): Site Characterization and CO₂ Capture Assessment, DOE selected five projects to receive USD $85 million to accelerate the wide-scale deployment of CCUS technologies. The projects selected under this FOA will assess and verify safe and cost-effective commercial-scale geologic storage sites for anthropogenic CO₂ emissions; and assess the technical and economic viability of carbon capture or purification technologies for sources that will supply CO₂ to the storage sites.
We hear and read a lot about all these terms, most of which seems to be hype – Industry 4.0, IoT, sometimes just IoT, AI, ML and so on. Can you please, in layman’s terms, explain what this all this is?

Abuali: We usually start from the top and define IoT as the Internet of Things. IoT is all about the connectivity of devices (e.g., machines, parts, homes, airplanes, etc.) using the internet/cloud and coupled with analytics, that drive value and a business to the end user. Then we talk about IoT – the industrial internet of things, as a sub-category of IoT applied in manufacturing and industrial applications to connect machines, lines, and critical assets in factories to the virtual (cyber) world of IT using the internet and cloud.

Then, there finally comes the tools to assist organizations to mature their operations and realize Industry 4.0, including Predictive Analytics (PDX) and PDX/AI tools – are methodologies and technologies that enable and empower organizations today to benchmark and improve their digital maturity and accuracy, and drive their digital transformation journey creating value within their own operations and externally to their customer base.

Now that we have an overview of the terminology and a simple definition, what does it all mean for my business? Is there a value proposition to be made or is this all FOMO (fear of missing out) regarding the newest topics to emerge?

Abuali: There are, in fact, significant value to any business. It all starts with the business case and ROI first and foremost. Software and technology are secondary. When we look at a manufacturing company, we first assess the digital maturity and needs of the organization. We evaluate things like connectivity to the plant floor, data collection maturity, the use of tools like MES (Manufacturing Execution Systems) and ERP (Enterprise Resource Planning). We benchmark people/process/technology. Then the business case becomes apparent, and it may differ from one area of the plant to another. In some areas, OEE (Overall Equipment Effectiveness) and uptime/availability is key, in order to improve and sustain high uptime in repetitive high-volume operations such as in automotive. In other areas, improving quality and reducing scrap and defects are key business drivers. In the maintenance department, optimizing PM (Preventive Maintenance) cycles to reduce spare part inventory and maintenance labor hours may be a key business driver. Once the business case is established, we “Think Big and Start Small.” An area or multiple areas of a manufacturing plant are selected and piloted with the right tools and technologies, like AI-based Predictive Maintenance and Predictive Quality to drive that business to success.

What are samples of some of the use cases and perhaps which one(s) should companies focus on?

Abuali: There are numerous Industry 4.0 use cases depending on the business case in mind. We define “smart factory” and “smart product” use cases that rely on performance and predictive analytics.

A key smart factory use case revolves around plant floor connectivity and data ingestion to machine monitoring and predictive maintenance technologies that provide real-time OEE analytics, as well as predictive insights into machine/asset health, remaining useful life prediction, and diagnostics of failure root cause. Such a use case can provide early fault detection and prediction and assist manufacturers to use artificial intelligence tools to transform their maintenance activities from a “fail and fix” to a “predict and prescribe” maintenance paradigm. As the use of predictive analytics matures within the organization, the ability to achieve prescriptive analytics becomes possible, allowing real-time decisions to be prescribed from the analytics such as feedback data back to the machine in real time to offset the machine recipe/program or automatically reject a defective part.

On the other hand, similar analytics are utilized for remote monitoring and diagnostics of “smart products” in the field, providing new service models for customer satisfaction. Asset data from the field can be used to drive replenishment of spare parts just-in-time and in a
and What is in it for You?

Quality use case at automotive and industrial clients to reduce their annual scrap rates by at least 1% per year per plant, and that provides on average a USD $250K per plant per year in savings. By using AI and machine learning techniques to correlate the casting machine data (over 50 parameters) to quality/scrap data from the machines, our technology can predict future scrap with over 90% accuracy and prescribe decisions in less than a few seconds, before the cast part leaves the machine. The maturity and accuracy of these predictive quality analytics allow manufacturers to realize the true power of 1% savings in defect reduction, and significantly minimize very-costly traceability and warranty recalls.

What do you see happening in the next 5 years? What’s new, wonderful or eye-catching?

Abuali: We see the heat of global competition forcing manufacturing organizations – large and small – to formally establish digital transformation strategies to standardize and mature their operations, in a phased approach. It all starts with plant floor connectivity, getting connected, creating a data lake of information captured in real time for assets and machines, new or old. Then, using the data captured to drive performance analytics using OEE and predictive analytics with predictive maintenance and predictive quality applications, to realize a zero-downtime, zero-defect future state of operations. However industrial and digital transformation is not just about connected products and connected assets. It’s also about the “connected worker”. We see a growing use of connected worker and wearable technologies using Augmented Reality (AR) to support operators and workers to do their job in a safer and more precise manner, thus improving productivity and quality, as well as helping out in worker training and remote assistance for maintenance production applications. At the end of the day, the digital transformation is fundamentally about people, process, technology.

How do I get started in my own company after reading this article?

Abuali: Start and strategize your Digital Transformation Journey Today. Think Big, Start Small, and Act Now! Then, make your journey operational with a proof of value, a technology pilot with a business case. Implement it, and track success. Then replicate the template out to other plants/processes. Train your internal center of excellence – your champion multi-disciplinary team that can shoulder the strategy and technology conversation and execute the vision.

Whether your industry 4.0 vision is a smart factory or a smart product one, you should maintain a Zero-Downtime / Zero-Defect Vision, and leverage technologies in an ROI-based fashion to drive value to your end customer and users. Lastly, find your weak link: People, Process or Technology. Benefits only accrue as far as the weakest link.

ABOUT THE AUTHORS

Stephen Cherlet is a senior management professional with 35+ year of experience. A graduate of Aerospace Engineering Technology at Ryerson (Toronto, Canada), he has worked in aerospace and defense for Bombardier Aerospace and Honeywell. His last role in industry was CEO at Velan Inc, a well-known valve manufacturer. Currently, Stephen is the owner/founder of FarStar S.A.C Consulting. He is also the Chair of the National Board of Directors at Supply Chain Canada. He can be contacted at stephen@farstarconsulting.com

Dr. Mo Abuali is the CEO and Managing Partner at IoTco, the internet of things company. He is a strategic and transformative technology and business management leader with 20-year record of achievement driving and sustaining change in Manufacturing. Mo serves Industrial and Manufacturing Clients in Automotive, Aerospace & Defense, and others, providing Digital Transformation, Industrial IoT (IIoT), and Predictive Analytics technology and services, as well as the IoT Academy for Training. Mo has a doctorate degree in Industrial Engineering.
Proper Selection of Check Valves

Check valves, during operation, may have vibrations in their internal Discs that produce repeated impacts of the Disc against the opening stops, causing wear and fracture of the hinge, pins or the bolts that hold it. Also, if the check valve is not properly selected, water hammer can occur in the pipeline.

By Felipe Ruiz de Chávez - Xanor de México

M. S. Kalsi¹ analyzes the minimum flow velocity to keep the disc in a given position and gives us the following formula:

Minimum flow velocity \( V = \frac{\sqrt{C \rho W}}{K \cos \theta} \) Where:

- \( C \) = Buoyancy factor, represents the weight of the disc in the fluid divided by its weight in the air.
- \( W \) = Disc effective weight.
- \( \theta \) = Disc impinging angle with respect to a horizontal plane.
- \( K \) = an empirical constant (> 1) that includes the fluid specific volume of the fluid.

Based on the theoretical model presented by M.S. Kalsi, this can be simplified to:

\[ V_{\text{min}} = K_1 \sqrt{V W/A} \] — Equation 1

Comparing Equations 1 and 2 it can be seen that the empirical formulas developed by traditional manufacturers are implicitly based on the assumption that the \( W/A \) ratio is constant for valves of different sizes and pressures. However, in reality, the weight of the disc is greater and the area of flow less, when the pressure range is increased.

Also the impinging angle of the disc varies from size to size and from manufacturer to manufacturer.

For this reason the minimum fluid velocity has to be calculated or experimentally determined for each valve size, design type, and pressure class. If the user valve has a low flow condition, it is best to install a smaller check valve size to accelerate fluid velocity and keep the disc stable.

The following table shows how the minimum required speed can vary with the impinging angle of the disc inside the valve, and as you can see, the recommended angle is between 30 and 35 degrees of inclination to keep the disc stable with a reasonable speed of the fluid. This needs to be taken into account by manufacturers to avoid problems in service.

Due to the asymptotic growth in the flow velocity requirement, small reductions in the impinging angle produces large increases in the required fluid velocity. In general, a greater angle offers greater stability on the disc and is therefore desirable, but an excessively large inclination can produce a low flow factor (Cv).

Comparatively, the check valve called “Tilting Disc” offers a contact area with the fluid in the disc of almost twice that of the “Swing” type check valve and the pivot is in a more centered, resulting that the “Tilting Disc” type check valve is much more stable to handle low speed or low density fluid conditions, such as Hydrogen, where normally a “Swing” type valve has stability problems.

Dynamic Characteristics of the Closing Speed in Check Valves

Piping systems can be damaged by changes in the direction of flow. When very fast closures occur, check valves produce transients where the internal line pressure can rise too high and cause the pipe to fracture or cause deformations and leaks in the system. In this case it is necessary to select a suitable valve design that guarantees safe operation.

Below is a graph of the dynamic characteristics of the check valves comparing the check valve type “Swing” with the type “Tilting Disc” and the type “Lift in Y” with spring-assisted disc.

As can be seen, the “Swing” type check valves are the valves that close the most violently. The “Tilting Disc” type, due to having a more centered pivot, close almost 10 times faster than a “Swing” type, thus preventing the reverse speed of the fluid from reaching high values.

The “Lift Y” type check valve has an excessively short opening stroke in relation to the size of its disc, which produces an instantaneous closure at a minimum deceleration of the fluid. The “Lift Y” valve is used for maximum protection.

Once the deceleration is known, the maximum return speed of the “Dynamic Characteristics Graph” can be determined according to the desired valve

¹ M. S. Kalsi
check valves with internal pin.

Conclusions

- The “Swing” type check valve requires a higher flow speed to obtain a stability on the disc than the “Tilting Disc” type.
- For the same deceleration of the fluid in the system, the closing speed is much lower in the “Tilting Disc” type valve due to the position of the pivot pin that promotes rapid closing, before the fluid accelerates. That means that the “Tilting Disc” type check valve protects the system more than a check “Swing” type.
- The “Y Lift” type check valve offers maximum protection, but it is necessary to evaluate the Cv (Flow capacity) before selecting them.
- It is necessary to determine the minimum required velocity to keep the valves with the disc in a stable position, for which it is necessary to take into account: Valve type, pressure class and fluid density. This is only accomplished by consulting the manufacturer and providing the system parameters such as flow, pressure, temperature, fluid properties (density, molecular weight, etc.) to determine the correct valve choice.
- For high integrity in check valves, they should be constructed without side holes in the bodies that produce leaks.

REFERENCES

The Importance of Hose Knowledge for the Valve Industry

The Hose + Coupling World Americas Conference & Expo 2020, taking place on October 6th and 7th at the George R. Brown Convention Center in Houston, TX, will be a meeting point for manufacturers, distributors and end users to learn about the latest technologies, components and systems in the field of industrial fluid transfer.

In light of the upcoming event, Valve World Americas recently had the pleasure of meeting with Kerry Millen, Piping Systems Engineer, to discuss her role as Chairman of the eagerly anticipated Hose + Coupling World Americas Conference & Expo 2020. With over 20 years of experience in the industry, Millen brings a wealth of knowledge to the role, which she aims to use to provide high-quality learning opportunities for guests and exhibitors at the event.

Millen takes time to highlight the benefits for members of the valve, hose and pump communities to attend the event, and provides insight into many of the important topics that will be focused on during the conference.

Advocating the importance of understanding the function and properties of each application in a workplace is a common practice for Millen. Through her experience, she has gained expertise with industrial hoses and couplings in various industries including: refining, oil and gas, and power.

In each of these industries, Millen has made it her goal to exceed the necessary maintenance and safety standards required to achieve a secure and danger-free environment for every employee. “People tend to overlook hoses because they think they are a minor piece of equipment, but they are not,” stated Millen. “Selecting the proper hose and coupling is integral to the safe and effective operation of each process.”

The versatility of hoses allows them to be used in a wide range of applications such as: uploading, offloading, utilities, and for the transfer of liquids, chemicals and sludge. As many of these applications have an element of risk involved with their operation, it is important that the user understands the limits of the equipment they have selected for the task at hand. “There is a lot more involved with hose selection than most people are aware. Material selection, maintenance requirements, and hose pressure and temperature allowances are all factors that must be taken into consideration before selecting and using a hose,” explained Millen.

“People tend to overlook hoses because they think they are a minor piece of equipment, but they are not,” stated Millen. “Selecting the proper hose and coupling is integral to the safe and effective operation of each process.”

By Angelica Pajkovic

The Benefit of Attending Conferences

In general, Millen is a strong supporter of attending conferences. “Not only do you have the opportunity to see new technology, you also have the chance to network with other industry professionals. Vendors that are exhibiting at the conference, as well as committee members, speakers, and other attendees, are all good people to meet and build relationships with,” expressed Millen. “With the Hose + Coupling World event,” she continued, “attendees simultaneously have the chance to broaden their knowledge of material selections, engage with new applications, and explore current market trends.”

Despite the hose-centric nature of the event, Millen stresses that attending the conference is also in the best interest of members of the valve, and pump communities. “If a valve vendor is in the market to supply complete packages to their client, it would be very beneficial for them to come to the hose event,” stated Millen. As valves are typically used to connect hoses to receiving stations, they play an integral role in ensuring that the supply of essential services, such as utility services, are transferable. “By attending the event, valve professionals have the opportunity to learn about the types of valves that are best suited to different hoses.
and be better able to offer products that meet their customers’ needs."

An individual from the pump industry, would similarly gain from attending the event. Small pumps and pumps on skids often use flexible hoses to transfer the material they are pumping from one location to another. “The ability to disconnect, move and reconnect pumps, without having to interact with hard parts, is highly beneficial from a time efficiency perspective,” explained Millen. “It would therefore be advantageous for individuals from the pump industry to attend the event to learn about which hoses and hose materials should be used to transfer various liquids, gases and materials. It would also be good for pump vendors who wish to offer their clients the whole package.”

**Dynamic Workshops**

One of the principle challenges for individuals in the hose industry are problems that arise due to misapplication.

“I think hoses are something we take for granted in this industry. As we always see them being used and they are always around, people tend to forget that they are designed for specific use in specific applications,” stated Millen. “That is why I believe that our goal of focusing on topics such as establishing maintenance programs, material selection, specialty applications, and developing relationships between distributors and suppliers, is so important.”

Ensuring that there is a good maintenance program in place, where the integrity of the hose can be monitored while ensuring that it is used for the appropriate applications, will mitigate the risk of workplace injuries and reduce costly delays of production. “There are different applications, different scenarios, different types of corrosion, different pressures and temperatures all of which have a huge impact on the efficiency and effectiveness of the hose. If you select the wrong type of hose or hose connection, and it is unfit to perform the operation you have tasked to it, it could cost somebody their life,” stated Millen. “Couplings will blow-off of the end of the hoses when pressurized if they have not been designed to withstand high pressures and a hose’s inner tube will collapse if it is not designed for high vacuum or high temperatures. That is why you have to ensure that you actually do your due diligence and learn how to select the correct hose application.”

For first-time attendees to the event, Millen recommends going to as many workshops as possible. “Picking the right application and understanding its properties is a team effort. We never know everything, so always work very close with your supplier and do your homework to ensure that your selection is the correct one.”

**Final Thoughts**

As an industry that has been around for over 100 years, Millen is confident in her conviction that the hose industry is here to stay. “Technology, materials and processes will continue to evolve and improve, and I am excited to see where they take us. By partaking in as many workshops as possible and networking with others in hose community, the industry has the opportunity to continue to move forward.”
Approaches to maintenance strategies vary from one company to another. Some rely on a run-to-failure strategy and deal as best they can with equipment that breaks in an unpredictable manner. They would love to have a proper preventative maintenance program, but the idea of keeping track of failure statistics, training personnel, and managing the process is just overwhelming. Life in these plants is an endless process of moving resources from one breakdown to the next.

Why this is so? Unfortunately, human beings tend to live in the “right here, right now.” Given the option between paying the maintenance cost today and paying the cost of a breakdown in an undisclosed future, they favor the latter. Especially if it is hard to link cause and consequence. Would you gamble a 30% probability of a valve failure roughly two years from now for the cost of a valve exercising program today? Most of the time the answer is yes and people respond knowing they will lose the bet, but they do it anyway.

Establishing a valve maintenance program is hard. It takes investment, specialized knowledge and discipline. Like all healthy habits, implementing them does not guarantee that only good things will happen. However, keep in mind that the alternative is much worse. Remember the adage: “If you think education is expensive, try ignorance.”

How to Set up a Successful Maintenance Program

Maintenance Basics

Establishing of a successful valve maintenance program requires resources from four areas:

1. Engineering – Knowing the specifications of the valves, their failure modes, and assigning adequate maintenance tasks according to their criticality.

2. Economics – The tasks developed in the Engineering phase must make financial sense. How much will each task cost and what are the consequences of either endorsing or rejecting the tasks? Establishing a solid basis for either endorsing or rejecting a task is critical to surviving the first budget meeting.

3. Psychology – Individuals tend to perform better when they understand the importance of what they are doing and receive adequate training to do it.

4. Management – The previous 3 steps must be consolidated and incorporated as part of company’s business. To achieve this, everyone involved in the program will need to commit to elaborate procedures, ensure that they are implemented, check on the compliance, and perform critical analysis of the system as a whole.

1. Engineering

The first step in the Engineering phase is to map all the valves in the plant. Although this may seem obvious, many aging plants lack updated technical valve documentation. With the help of drawings, P&IDs, pictures and whatever documentation is found, it is essential to build a database of all the valves in the plant. The documentation must contain at a minimum - the basic information for each valve: TAG, type (with design standard), size, body material, pressure class, manufacturer and model. For more recent plants, the database should contain all the information retrieved from the data sheet used to procure the valve (along with any agreed deviation).

The valves must now be assessed based on their criticality to the plant - assessing if they pose any potential risk, including environmental impact. It is common to divide the valves in groups in this phase: safety, control and, block. Safety valves, such as pressure relief valves and actuated blowdown and shutdown valves, are normally regulated, be it by design code or government policies, and are often subject to external audits. The scope of the maintenance tasks and their frequency are a matter of law, so they tend to be followed and do not require much internal convincing for the resources required. Control valves are actuated valves capable of modulating (or throttling) the flow conditions of a fluid, according to the demands of the plant process. Control valve are used as a final element in a control loop, which requires a sensor and a controller. The sensor measures some variable (pressure, temperature, etc.) and the controller compares the value to a given standard. The results of this measurement may trigger a command to increase or decrease the valve opening. Depending of the process, a control valve may modulate thousands of cycles per year and its capacity to accurately move to the determined position is vital to avoid unwanted fluctuation in the process.
Block valves are on-off valves that operate by being either fully opened or fully closed and are used for stopping or starting the flow of a process fluid. They are commonly required for the by-passing of a piece of equipment, for switching from a process train to another (when there is equipment redundancy) and for isolating sections of piping in order to safeguard technicians performing maintenance tasks. Valve types usually specified for this function are gate, ball, butterfly, actuated and hand operated.

Control valves and block may also be subject to safety and environmental concerns. These two groups together form the largest quantity of valves in a plant. Due to their sheer number, it is very rare that they all get "acquainted" with a maintenance technician for preventive maintenance. Some must be chosen to run-to-failure (repair or replacement after failure) and some will be granted with a preventive maintenance schedule.

2. Economics

Although valve manuals tend to provide general guidelines for maintenance, they rarely provide answers for questions like "What is the maximum amount of time I can leave this valve without maintenance in this particular application of my process?". As no two valves in a plant deal with exactly the same process conditions, valves with the same specification and from the same manufacturer often require different maintenance tasks, depending on its application and location in the plant. This is because industrial plants are a complex environment, which often develop micro-conditions for specific spots in the piping. Small fluctuations in temperature combined with a wind direction and some contaminant from a nearby process may provoke failure in a valve that, if located a little downstream, would perform for many more years. If the supplier’s manuals offer little help in providing hard facts for the economical evaluation, the information must come from somewhere else. The usual place to find this type of information is in the failure history of the valves and their correspondence with downtimes. A proper failure data base must contain what happened (failure mode), the consequences of the failure, how long it took for the situation to normalize, and what resources were used. It takes a lot of effort to build and keep updated a system with all this information. Without thorough documentation, the economic elements of the program become guesswork.

3. Psychology

Currently, industrial plants rely on people to perform the majority of the maintenance tasks in valves. While some Artificial Intelligence is used to monitor a control valve somewhere, a robot capable of preserving, exercising, inspecting and making minor adjustments in a valve has yet to be invented. That leaves us with people to carry on the maintenance duties. It is therefore vital that employees understand the importance of what they are doing and how it will benefit the business. To ensure that this is done effectively, three things are required: proper training, a system of accountability, and being given enough time to perform the tasks. A valve that was cleaned, inspected and exercised (a complete or partial actuation, part of many preventive maintenance programs) is often indistinguishable from one that was not. Audits must take place from time to time to review compliance and correct behavior.

A maintenance program that overwhelms the operator with tasks, gives insufficient time to complete said tasks and has no accountability mechanism, is prone to failure. In short, a maintenance program greatly increases its chance of success when it provides: facts, proper tools, a workable schedule, and intelligible instructions.

4. Management

A maintenance program without the commitment of all the echelons in the hierarchy of a company is a losing program. If the area manager does not feel accountable for breakdowns related to maintenance failures, why would he/she enforce them? Or why allocate resources if his/her yearly bonus has no KPIs (Key Performance Indicator) associated to maintenance?

Hopefully, the top management individuals in a company are fully convinced by the presentation about maintenance programs given in the Economics phase, and will now see to the following actions:

Procedures: Procedures must be written to define clear roles, responsibilities and resources. Estimates of the time needed to complete the tasks must be part of the procedures, in order to ensure proper sizing of teams. A user-friendly software system will help a lot. The software will be responsible for recording the tasks and regulating the maintenance frequency. Another procedure that should be discussed relates to outsourcing maintenance. For some of the more complex valves (control valves, for example), outsourcing alleviates some of the burden of training and tends to guarantee a better performance.

Training: The purpose of training is to ensure that individuals know what to do, how to do it and how to report it. They need to recognize abnormal or critical situations and act accordingly. Formal courses and awareness campaigns should be given from time to time, targeting not only employees but also managers.

KPI and Expectations: KPIs and corresponding expectations need to be defined, cover subjects like maintenance schedule adherence, work quality, valve reliability, downtime reduction, and costs. Quoting Lord Kelvin, “If you can’t measure it, you can’t improve it.”

Auditing: Maintenance tasks are often repetitive and, for the lack of a better word, boring. Even well-meaning employees may feel tempted to some-times neglect part of the tasks assigned. So, checks and audits must be put in place to safeguard the program. For example, a manual operated valve recently serviced may be inspected and exercised to find any signs of discrepancies between the feedback report and actual conditions.

Review and Improve: The program and its results must be frequently reviewed, not only by the maintenance team but also by related disciplines such as process and instrumentation. Higher management must contribute with critical analysis and promote overall engagement via lessons-learned seminars.

BY THE AUTHOR

Davi Correia is a Senior Mechanical Engineer who has worked at a major Brazil-based oil company for the last 15 years. Correia is part of multi-disciplinary team that provides technical support for topside piping and equipment of production platforms. During this period, he began to work with materials and corrosion, and later moved to piping and accessories technology, where he has become one of the lead technical advisors on valve issues. Correia was part of the task force that revised the DNGP S-562 standard, and wrote the S-611 standard. Correia has a master’s and doctor’s degree in welding by the Universidade Federal de Uberlandia.

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Fugitive Emissions Summit Americas 2020 - to be Rescheduled

After much consideration, the Fugitive Emissions Summit Americas 2020, that was to take place on June 16th and 17th at the George R. Brown Convention Center in Houston, TX, has been rescheduled due to the COVID-19 pandemic. With continued concerns surrounding health and travel, the Fugitive Emissions Summit Americas team felt this decision would be the best way to keep exhibitors, speakers, attendees, staff, and the Houston community safe. The Fugitive Emissions Summit Americas team would like to thank event Chairman, Bronson Pate, Global Vice President of RFS Compliance Solutions, as well as the Steering Committee for their continued support and dedication to developing an educational conference program, which we look forward to delivering in the fourth quarter of 2020. The Fugitive Emissions Summit Americas 2020 will bring together a community of end users, EPCs, distributors, manufacturers and suppliers dedicated to improving workplace practices, in efforts to reduce environmental damage caused by industrial emissions. The informative conference and exhibition will address the ever-changing world of fugitive emissions regulations and control.

The Fugitive Emissions Summit Americas is the ideal meeting point for the environmental community to share knowledge and forge business relationships for the future. With the exhibition running simultaneously to the conference, companies will have the opportunity to exhibit to the American market.

The conference program will strongly focus on Leak Detection and Repair (LDAR), Benzene Waste (BWON), Tanks, Monitoring & Testing Technology, Air Permitting, Emission Control & Prevention, and Best Management Practices. As we highlight emission initiatives around the world, we veer closer to a cleaner and more sustainable future. Together we aim to keep environmental innovation in the limelight, where it belongs.

The Fugitive Emissions Summit Americas team is looking forward to seeing you as soon as possible, and will deliver further details as the COVID-19 situation continues to develop.

Thank you for your continued support and stay safe.

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